

## CERTIFICATION OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY THAT THIS PAPER IS BEING FACSIMILE TRANSMITTED TO THE PATENT AND TRADEMARK OFFICE ON THE DATE SHOWN BELOW.

Deanna Sullivan

TYPE OR PRINT NAME OF PERSON SENDING CERTIFICATION  
 SIGNATURE: *Deanna Sullivan* DATE: 5-29-98

Approved 6-15-98 gm

**Fig. 23**

Example 12								
TEST RESULTS ON COPPER-CLAD EPOXY GLASS, GLASS POLYIMIDE, AND POLYIMIDE								
Sample	Via Diameter ( $\mu\text{m}$ )	Speed (mm/s)	Bite Size ( $\mu\text{m}$ )	Rep Rate (kHz)	# Passes	Taper ( $\mu\text{m}$ )	Throughput (holes/sec)	
1	102	8	--	3.2	15	12	1.7	
2	51	3.2	--	1.6	10	12	2.4	
3	102	7.8	--	3.1	5	12	4.4	
4	51	3.2	--	2.1	2	12	7.8	
5	25	N/A	--	4	100 pulses	12	15	
6	102	7.6	--	1.5	6	12	3.8	
7	51	3.2	--	1.6	4	12	5.3	
8	102	8	--	+5	10	12	2	
9	51	3.2	--	+20	1	12	3.7	


**Fig. 24**

**Power Density = Fluence/Pulse Width**

	Average Power	Spot Size Diameter	Spot Size Radius	Repetition Rate	Spot Area	Spot Area	Power/Rep. Rate	Fluence	Power Density	
	mW	micro-m	micro-m	Hz	m <sup>2</sup>	cm <sup>2</sup>	J	J/cm <sup>2</sup>	@40 ns	@90 ns
Example 12										
Sample 1	225	25	12.5	3200	4.91E-10	4.91E-06	7.03E-05	14.32	3.58 x 10 <sup>8</sup>	1.59 x 10 <sup>8</sup>
Sample 2	225	25	12.5	1600	4.91E-10	4.91E-06	1.41E-04	28.72	7.18 x 10 <sup>8</sup>	3.19 x 10 <sup>8</sup>
Sample 3	225	25	12.5	3100	4.91E-10	4.91E-06	7.26E-05	14.79	3.70 x 10 <sup>8</sup>	1.64 x 10 <sup>8</sup>
Sample 4	225	25	12.5	2100	4.91E-10	4.91E-06	1.07E-04	21.79	5.45 x 10 <sup>8</sup>	2.42 x 10 <sup>8</sup>
Sample 5	225	25	12.5	4000	4.91E-10	4.91E-06	5.63E-05	11.47	2.87 x 10 <sup>8</sup>	1.27 x 10 <sup>8</sup>
Sample 6	225	25	12.5	1500	4.91E-10	4.91E-06	1.5E-04	30.5	7.63 x 10 <sup>8</sup>	3.39 x 10 <sup>8</sup>
Sample 7	225	25	12.5	1600	4.91E-10	4.91E-06	1.41E-04	28.72	7.18 x 10 <sup>8</sup>	3.19 x 10 <sup>8</sup>
Sample 8	225	25	12.5	5000	4.91E-10	4.91E-06	4.5E-05	9.16	2.29 x 10 <sup>8</sup>	1.02 x 10 <sup>8</sup>
Sample 9	225	25	12.5	20000	4.91E-10	4.91E-06	1.13E-05	2.30	5.75 x 10 <sup>7</sup>	2.56 x 10 <sup>7</sup>